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Bouncing Back: Students learning through real-world experiences

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Abstract

The Bouncing Back research study, which began after the Queensland flooding in January 2011, has organically expanded through a number of architectural student design projects and exhibitions, which have sought to respond to catastrophic flooding events. In September 2011, 10 Queensland University of Technology architecture students travelled to Sydney to help construct a 1:1 true-to-life scale shelter, for the Emergency Shelter Exhibition at Customs House in Circular Quay. During the construction of the shelter, data were collected in situ, through dynamic interviews with the students. Using a grounded theory methodology, data were coded and then thematically analysed, to reveal three influential factors that positively impacted the students' learning in this informal context. These were the *student experience*, the process of *learning through physical making/fabrication*, and development of *empathy with the community*. Analysis of these three factors demonstrated how this informal situated learning activity promoted vitally important learning in a real-world context, which is difficult to replicate in a physical on-campus environment.

Architectural Education; Informal Learning; Student Experience; Learning Through Making; Community Empathy; Real-world Context

Background

In January 2011, catastrophic flooding impacted three quarters of the state of Queensland, Australia. The Bouncing Back research project originated as an exhibition of student's architectural designs, which responded to adversity through the emotive language of design. Following the conclusion of the design project, a group of students traveled to Sydney to engage in the construction of a Modulo emergency shelter as part of the Emergency Shelter Exhibition, at Customs House in Circular Quay. This study examines the students' experience of learning through making within this real-world context. Participants in this

study were 10 fourth year and masters level architectural design students, at Queensland University of Technology [QUT], in Brisbane. During the emergency shelter construction, the student participants were interviewed, allowing for the dynamic, real-time data acquisition.

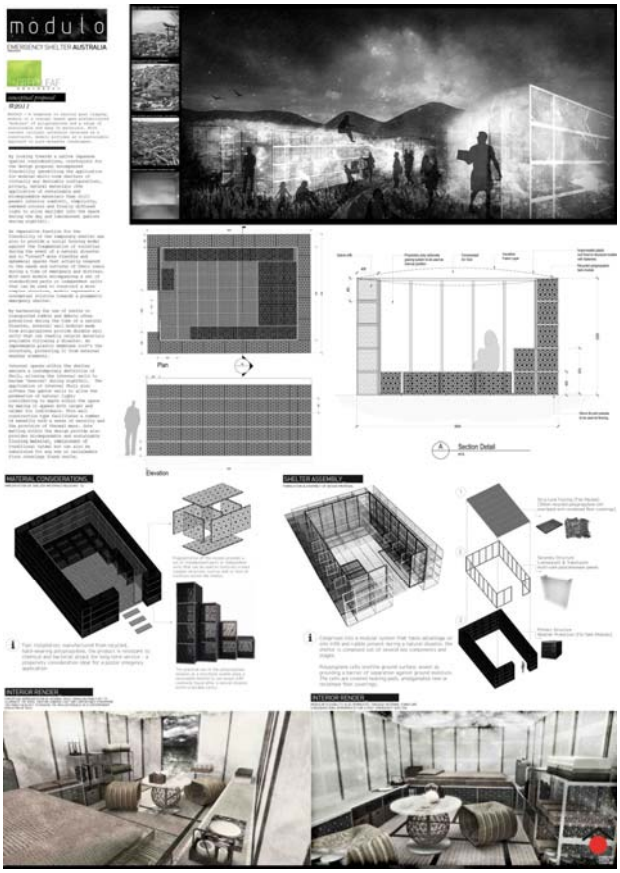

Figure 1: Design drawings of the Modulo Emergency Shelter

The Emergency Shelter Exhibition was conceived of and curated by Jun Sakaguchi, an architect working at PTW Architects in Sydney. The facilitation of this exhibition was a direct and very personal response to the devastating Tohuku Great Earthquake that catastrophically impacted Japan in 2011. The intent of the exhibition was to raise awareness of the positive role that the profession of architecture and the construction industry can play, in important disaster response, while highlighting the need for innovative emergency shelter design and provision in disaster zones. Through a competitive tender, nine local and international architects were selected to design and construct an emergency shelter on the forecourt of Customs House, in Circular Quay. The construction of the shelters took place in situ, in the days leading up to the formal opening of the exhibition. After safety induction processes, student volunteers from Australian universities participated in the construction of the emergency shelters. The official opening of the exhibition boasted approximately 700 people in attendance.

Literature Review

The benefits of providing situated informal learning, and in particular those based on real-world experiences, are clear. Architectural education has recognised the positive potential of a more intensive relationship between the tasks of designing and those of building (Erdman et al., 2002). Complex real-world problem solving introduces a density and challenge to the design studio, which requires experimentation, collaboration, playful and imaginative responses, and a genuine integration of theory and practice - all focused by the student perception of relevance, and one provided by the real-world context (Zehner et al., 2010). Often real-world experiences within the academic setting focus on community-based projects. They create opportunities for students to understand pressing social issues and develop a sense of civic responsibility and ethical practice, relevant to their disciplines (Corkerey et al., 2007). Experiential learning serves to counteract purely theoretical classroom instruction, and assists in motivating lifelong learning by providing tangible opportunities, (Markus et al., 1993) thereby establishing important linkages between the academic context and situated real-world learning.

The process of learning through making or fabrication in an architectural context, provides an important assistance when engaging students (Caldwell, 2010). Drawing and model making are unique forms of dialogue, which can be utilised to explore deeper understanding of design (Crowther, 2007; Caldwell, 2010). Gore argues that the intelligence and critical thinking of making, is an essential aspect of the architectural design studio (2004). Exploration through material based projects, often crafted by hand, helps to promote the development of critical discourse between the maker and the object (Gore, 2004). Building on the knowledge that the process of making positively informs learning, the transition from making scaled models to full-scale built explorations, is emerging as a transformative component of both architectural education and professional practice (Erdman et al., 2002). By facilitating the making process at a full size scale, opportunities are provided for bodily senses to understand mass, texture, smell, sound and colour; and the learning experience to a deeper level when considering how these vital characteristics of space interplay with each other and with other materials and processes (Gore, 2004). Gore argues that the learning is developed through thinking and direct experiences, which force students to think in more complex ways (2004). It is clearly evident that the process of making and interacting with materials to help create space at any scale enriches students' learning.

Interdisciplinary design courses, which feature community-based projects, create opportunities for students to understand pressing social issues and to gain an understanding of civic responsibility and ethical practice, relevant to their disciplines (Corkery et al., 2007). A service learning pedagogical approach promotes meaningful student engagement through applied, active, project-based learning; it draws on multiple knowledge sources (academic, student, community and experiential, knowledge), and provides students with ample opportunities for ethical and critical reflection, and practice (Hurd, 2008). By confronting issues and problems within a complex natural context, service-learning courses help students

to develop a deeper understanding of subject matter, a practical knowledge of community decision-making processes, and strategies to allow transferring knowledge and problem solving skills to new situations (Hurd, 2008). Helping students to develop these kinds of socially-responsive intellectual skills is an essential 21st century literacy, that requires adaptability, sophisticated knowledge, problem-solving capacities, and life-long learning skills (Hurd, 2008).

Research Methods

This study builds on previous research, which examined the process that design plays in assisting students to comprehend and process, adversity. In this earlier research, it was found that the real-world experience provided by encouraging architectural students to respond to natural disaster events through design, positively affected their learning and healing process (Caldwell & Osborne, 2011). In order to gain a deeper understanding of the benefits of providing students with a real-world experience, this second study focuses specifically on the outcomes of the experience of students' who engaged in the Emergency Shelter Exhibition. Ten QUT architectural students were interviewed in situ and whilst constructing a full-scale emergency shelter. Using a qualitative grounded theory methodology, interview data were coded and thematically analysed, to identify three key themes that contributed to the students' learning in this real-world context. Influential factors that positively impacted learning in this informal context were: the *student experience*, the process of *learning through physical making/fabrication*, and development of *empathy with the community*.

Discussion

Theme 1: The student experience

Approximately one third of the student responses were thematically categorised around the issue of *student experience*, indicating that, to them, this was the most important aspect of their reflections. The real-world experience provided students with an opportunity to engage with a different set of issues, than with those normally provided within the controlled environment of the university design studio. Students demonstrated evidence of an understanding that a real-world context provides an extension to their theoretically focused coursework. Some students discussed potential opportunities for an integration and exposure to real-world situations or conditions earlier and more frequently in their course, indeed some requesting this once a year or semester, as it providing such obvious increased learning opportunities. Students were aware of the relevance and the learning value, which made the learning experience more enriching. They argued that they want to *"…actually build something hands on, because you learn so much more" [E.08]*.

In this specific study, the students did not design the emergency shelter that they helped to construct. They were therefore not familiar with the details of the specified materials, the detailing and connections, and how the overall system operated. In effect, this meant that they worked as unskilled labourers, which in a disaster situation would be an authentic real-world scenario. The students related to participating within a broader community through collaborative means, to achieve an end result: *"…we had no involvement in designing the shelter so we are almost like the community that has been affected, and now we are trying to rebuild it and its interesting to watch the spirit that we have been developing within our team and the way that we have been working together and helping each other" [E.01]*.

Figure 2: Students reviewing the Modulo Emergency Shelter design drawings

By participating in an authentic situated event which was designed to respond to a real issue, the design appeared to be of higher value and motivated the students to work harder, to ensure that the emergency shelter was the 'best it could be': *"…its not just design for design's sake… it's required solutions and I think that's what made it very interesting and made us more willing to jump in and make it the best it could be" [E.11]*.

When considering design as a tool, students meaningfully connected to the emergency context on a deeper level, which thereby allowed them to respond to the needs of the community more authentically. The real-world context also allowed students to imagine themselves role-playing the very persons who had been impacted by a natural disaster. Removed from the on-campus physical studio environment, students were removed from a familiar set of resources and materials. Although not on the same scale or in the same context, this experience allowed students to feel what it would be like to be in disastrous situation. As one student noted: *"…we ran out of materials and we needed things but in an emergency situation you can't go down to Bunnings [a local hardware store] and buy more zip-ties" [E.05]*.

Figure 3: Students celebrating their achievements after completing construction

Theme 2: The process of learning through physical making/fabrication

Approximately one quarter of the student responses related to the process of *physical making/fabrication*, and how this impacted their learning experience. Students drew comparisons between the benefits of working at a 1:1 true-to-life scale, with the smaller scaled model, typical to the design studio. An understanding of the dimensions of materials and how they physically join, became tangible when operating with the true-to-life scale: *"…when you physically hold a 600 by 500 box, those dimensions become so much more real against your body" [M.04]*.

Figure 4: Students constructing the Modulo Emergency Shelter

Students did not fully comprehend the complexities of how different materials fitted together, until they physically enacted it, in practice. Students were able to discriminate between what they had simplistically assumed during the design process, and how the components were actually constructed on site. A practical and 'hands on' experience is often

logistically limited in architectural education, however it became evident that this experience provided students with a deeper and very valuable understanding of the construction process: *"You can design something… but until you put it together you don't really know if it will fit" [M.06]*.

Architectural design students often immerse themselves within the digital realm, by relying on the use of three-dimensional computer modeling software. This appears to be the preferred option for the majority of students, as software is now readily accessible and provides a fairly professional looking design manifestation in a short amount of time. Students perceptively discussed the differences between operating purely within the digital realm, and how it compares to the reality of working with physical materials in a real scenario: *"…in a digital realm it looks like something comes together… but it is a completely different story when you are working with real materials in real time with real people" [M.03]*.

Further to this, the physical on site location, and the meagre provision of somewhat limited materials to construct the emergency shelter, inspired a creative problem-solving process for the students. Although they had not invested in the initial design of the shelter, the process of construction was an opportunity for the students to take ownership and creatively approach the challenges of being on site: *"…you have to try to make it work and see what you can do with zip ties and rope… a very creative experience" [M.01]*.

Figure 5: Students constructing the Modulo Emergency Shelter

Construction of the emergency shelter permitted students to think about the purpose and meaning of 'shelter,' on a deeper level. The students began to imagine themselves as the people who would potentially build and use, the emergency shelter. One of the students reflected on how this experience would improve their design skills, as it augmented the perception and perspective of the designer. Experiencing the process of construction allowed students to understand potential problems they may face if they were required to construct an

emergency shelter themselves: *"…it really helps being here to physically build it… I think it will only help us design better" [M.08]*.

Theme 3: Development of empathy with the community

The data indicated that students who participated in the construction of the emergency shelter drew associations between their experience and the persons/communities who had faced natural disasters. Although the situations were obviously vastly different, the students demonstrated an understanding of the complexities of operating within an emergency situation. Not having access to electricity, or spare materials and tools at hand, authenticated this in part. With limited provision of basic elements, the students quickly developed an awareness of the impact of their disconnection, and spoke of the empathy they were feeling towards the communities which they were, in a sense, role-playing.

The process of constructing the shelter served to empower the students. By working as a team to construct the shelter, this shared experience connected them to each other and as a community. Students' recognised the importance of identity and empowerment within the construction process, and the influence this has on the recovery process: *"…in a disaster like this, community really comes together and wants to help and… retain a sense of their identity" [C.04]*.

Figure 6: Students in conversation with the site foreperson

These reflections helped to demonstrate the students understanding of the importance of the community in recovery leadership, and the participation in rebuilding being a part of that process. The architect has an important role to play, one that must respect the needs of the community on multiple levels and which should assist in the reconstruction of the community, but not necessarily lead it (Swete Kelly & Caldwell, 2014).

Conclusion

Although it is not possible to easily quantify or place a monetary value on the experience provided to students exposed to situated real-world scenarios, we believe that the students who participated in the construction of this emergency shelter had a different and arguably improved experience, to that provided within the context of a purely on-campus, formal learning environment. The data indicate that the students learned more than just architectural theory or practice, which tend to dominate the architectural curriculum. The students learned crucial lessons about participating in a community, they learned about construction at 1:1 true-to-life scale, and they learned about the importance of enriching the design experience through exposure to new and different situations based on real-world issues.

Through their emersion in physical making and working at a human scale, students developed a better understanding of and sensitivity to, adversity. Physically constructing the shelter at a full scale was, for the most part, a new experience for the students. The real-world experience was and will continue to be, critical to enriching the learning experience of architectural design students. The opportunity to construct a small shelter at a full scale, allowed students to physically place themselves within the space of the shelter and by doing so, they began to comprehend the issues that people suffering within an emergency situation, may face. The students empathised with the people for whom the shelter was designed and constructed and how the vital characteristics of space interplay with each other and with other materials and processes - a learning experience that could not be fully understood, without the powerful process of making.

Figure 7: The completed Modulo Emergency Shelter

Ultimately the opportunity to expose Architecture students to the construction of an emergency shelter not only informed their learning, but also reinforced the value and meaning of Architecture as a profession. Not only do Architects focus on designing and constructing spaces, they also create useful places that are meaningful to their communities. The emergency shelter concept takes us back to the very basics of Architecture, to address the fundamental needs of protection and comfort for survival. This scenario reminded students that the profession of Architecture does not only lean towards technology driven design, but it also faces the day-to-day realities of creating shelter and places for living. Architectural education must address the role that future architects have in designing thoughtful buildings that are responsible and respond to the needs of the community.

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Author Biographies

Lindy Osborne

Originally educated in South Africa, Lindy moved to Australia in 1996 where she commenced working as an architect, at Cox Rayner Architects in Brisbane. During her twelve years of practice, she received 14 industry awards in addition to her work being recognised in multiple printed media. Lindy decided to pursue a full-time academic career, in 2008; now a Senior Lecturer in Architecture at Queensland University of Technology [QUT], Lindy has taught in all areas and all years of the course, but specialises in Design, Professional Practice, Technology and Research. Lindy was awarded a Vice Chancellor's Performance Award for Teaching Excellence, at the end of her first year as a full-time academic and an Australian Government Office of Learning and Teaching Citation, in 2012. Lindy's research interests centre around innovative Design Education and the Design of Future Learning Landscapes: Linking Space, Place, Pedagogy, Technology + Context. She is currently enrolled in her PhD at QUT, with an expected completion date of 2016, and has been a Registered Architect in Queensland, since 2000. Lindy is currently seconded to QUT's, Chancellery as a Transformation Fellow, where she is working in a team to transform future post-graduate level online education.

Glenda Amayo Caldwell

Glenda is a PhD candidate and researcher in the Urban Informatics Research Lab and a Lecturer in Architecture. She has a Bachelor of Science (Architecture) from the University of Michigan, Ann Arbor, USA. Having commenced a Masters in Architecture at SCI-Arc in Los Angeles, she completed the degree in Miami at the Florida International University. Glenda participated in the dLAB course at the Architecture Association, London in 2009, focusing on digital fabrication. Glenda is the unit coordinator for fourth year architectural design and first year 'Architectural Visualisation II'. Other teaching responsibilities have included Masters design and research, third and second year architectural design, 'Integrated Technologies', 'Introduction to Design History', and 'Sustainable Systems'. Through Glenda's teaching and research she questions the effect of media and technology on the design of architecture and urban environments. Her investigations explore the connection between the digital layers and the physical layers of the city and how tangible expressions of the interrelationships between them create and define new experiences of place, creating hybrid place. Glenda uses architectural design methods and theories combined with interactive media and urban informatics to provoke and stimulate urban opportunities for the social interaction, adaptation, and appropriation of hybrid place.